

**California Regional Water Quality Control Board
Santa Ana Region**

April 4, 2003

ITEM: 14

SUBJECT: Basin Plan Amendment Hearing: Incorporation of Diazinon and Chlorpyrifos
Total Maximum Daily Load for Upper Newport Bay and San Diego Creek

DISCUSSION

On February 21, 2003 the Regional Board conducted a Water Quality Control Plan [Basin Plan] amendment workshop regarding the diazinon and chlorpyrifos Total Maximum Daily Load (TMDL) for the Newport Bay watershed. Upper Newport Bay and San Diego Creek have been identified as water quality impaired and included on California's 1998 Clean Water Act Section 303(d) list due, in part, to aquatic life toxicity. The toxicity has been attributed largely to diazinon and chlorpyrifos.

Development of a TMDL for diazinon and chlorpyrifos in San Diego Creek, and for chlorpyrifos in Upper Newport Bay was initiated in 2001 as part of the TMDLs for toxic pollutants in the Newport Bay Watershed. The United States Environmental Protection Agency (USEPA) worked jointly with Santa Ana Regional Board staff to develop these TMDLs. On June 14, 2002, the USEPA established TMDLs for 14 toxic pollutants, including chlorpyrifos and diazinon. The TMDLs established by USEPA did not include implementation plans.

Subsequent to the establishment of the USEPA TMDLs, Regional Board staff prepared a draft amendment to incorporate the diazinon and chlorpyrifos TMDL, including an implementation plan, into the Basin Plan. The draft amendment was presented as an attachment to draft Resolution No. R8-2003-039 for approval of the proposed amendment (the draft Resolution was identified as Appendix C to the February 21, 2003 staff report; the draft amendment was identified as Appendix D to that report). As discussed below, some changes are recommended to the proposed amendment in response to comments received. The final proposed Basin Plan amendment is shown in the attachment to Resolution No. R8-2003-039.

Changes to the February 21, 2003 draft Basin Plan amendment

Revisions have been made to the draft Basin Plan Amendment. The revisions are shown in the document "Revisions to the February 21, 2003 Draft Attachment to Resolution No. R8-2003-039"(Appendix A). The changes are noted below with an explanation for each revision.

1. Introductory text has been added for the section titled "Toxics Substance Contamination" under the Newport Bay Watershed discussion in Chapter 5 of the Basin Plan. The existing text in this section of the Basin Plan is recommended for deletion because it is outdated and does not reflect the development of the Toxics TMDLs. The proposed introductory text includes a new table

(Table 5-9i) that provides a list of the Toxic TMDLs established by USEPA in June 2002, and emphasizes that this diazinon/chlorpyrifos TMDL is the same as that promulgated by USEPA.

2. The USEPA re-registration agreements have been added to the implementation tasks in Table 5-9i in order to maintain consistency with Table 9-1 in the TMDL report (Appendix A to the February 21, 2003 staff report).
3. The date for submission of an annual monitoring report has been changed from September 1 to November 30 in order to make the reporting schedule consistent with existing reporting schedules under the Newport Bay Watershed nutrient TMDL Regional Monitoring Program and the Orange County Municipal Stormwater Permit. This change was requested by Orange County Public Facilities and Resources Department (see Appendix B).
4. Table 5-9i and Figure 5-2 were inadvertently omitted from the February 21, 2003 draft amendment. The table and figure indicate the minimum required monthly sampling locations and have been incorporated in the proposed amendment.
5. The text describing Task 5 (Special Studies) has been revised to clarify that the Regional Board will conduct the studies, with the anticipated assistance from stakeholders in the watershed.
6. The phrase "numeric targets" in the paragraph describing Task 5 (Special Studies) has been replaced by the more accurate terminology of "allocations."

California Environmental Quality Act (CEQA) Requirements

The basin planning process has been certified by the Secretary of Resources as functionally equivalent to the requirement of the California Environmental Quality Act (Public Resources Code Section 21000 *et seq.*) for preparation of an Environmental Impact report or Negative Declaration.

The February 21, 2003 public workshop also served as a public scoping meeting to discuss the proper scope and content of the functional equivalent environmental document to be prepared for this proposed amendment.

The Regional Board is required to complete an environmental assessment of any changes the Board proposes to make to the Basin Plan. The Environmental Checklist (Appendix E to the February 21, 2003 staff report) determines that there are no significant adverse environmental impacts from the proposed Basin Plan Amendment. This report, the February 21, 2003 staff report, and the Environmental Checklist attached to the February 21, 2003 report are functionally equivalent to an Environmental Impact Report or Negative Declaration.

Public Participation

Federal regulations at 40 CFR 130.7 require that TMDLs be subject to public review. The Regional Board, in its consideration and adoption of this proposed TMDL, is following the Basin Planning public review process. A public workshop and CEQA scoping meeting was held during the Board meeting on February 21, 2003. The draft TMDL Basin Plan amendment was also presented to stakeholders at a meeting of the Newport Bay Watershed Management Committee on February 26, 2003.

Specific public notice requirements pertaining to this Basin Plan amendment have been fulfilled. A Notice of Public Hearing and Notice of Filing were published in a newspaper of wide circulation in Orange County at least 45 days prior to the hearing. These notices were also mailed to all interested persons and agencies on the Regional Board Basin Plan mailing list. The notices, along with the draft resolution, amendment, environmental checklist, and TMDL report, were also made available on the Regional Board website at least 45 days prior to the hearing.

A Notice of Decision will be filed after the Regional Board, the State Board, the Office of Administrative Law and the U.S. Environmental Protection Agency act on this matter.

Comments and Responses

The February 21, 2003 staff report includes a discussion of the comments provided by the scientific peer reviewers, and the changes made in the TMDL report (Appendix A to the February 21, 2003 staff report) on the basis of those comments. The peer review comments and responses are included in Appendix B to the February 21, 2003 staff report.

As of March 20, 2003, comments have been received on the draft Basin Plan amendment from the County of Orange Public Facilities and Resources Department (OCPFRD). The comments and responses are summarized in Appendix B. OCPFRD recommended changes to the TMDL report, as well as to the proposed Basin Plan amendment. In response, staff recommends that certain changes to that report be made, as shown in Appendix C.

RECOMMENDATION

Adopt Resolution No. R8-2003-039, incorporating the amendment shown in the attachment to the Resolution, into Chapter 5 of the Basin Plan.

APPENDICES

This staff report contains the following appendices:

- Appendix A: Revisions to the February 21, 2003 draft Basin Plan Amendment
- Appendix B: Public Comments and Responses
- Appendix C: Revisions to the February 21, 2003 draft TMDL Report

**California Regional Water Quality Control Board
Santa Ana Region**

RESOLUTION NO. R8-2003-039

Resolution Amending the Water Quality Control Plan for the Santa Ana River Basin to Incorporate a Diazinon and Chlorpyrifos Total Maximum Daily Load for San Diego Creek and Upper Newport Bay

WHEREAS, the California Regional Water Quality Control Board, Santa Ana Region (hereinafter, Regional Board), finds that:

1. An updated Water Quality Control Plan for the Santa Ana River Basin (Basin Plan) was adopted by the Regional Board on March 11, 1994, approved by the State Water Resources Control Board (SWRCB) on July 21, 1994, and approved by the Office of Administrative Law (OAL) on January 24, 1995.
2. The Basin Plan specifies the narrative water quality objective for San Diego Creek and Upper Newport Bay that toxic substances shall not cause adverse impacts to beneficial uses.
3. The narrative objective for toxic substances is not being achieved in San Diego Creek and Upper Newport Bay due to persistent aquatic toxicity, as demonstrated by monitoring data collected from these waterbodies. Beneficial uses adversely impacted by aquatic life toxicity include WILD and WARM in San Diego Creek and BIOL, COMM, EST, MAR, RARE, and SPWN in Upper Newport Bay.
4. Investigations conducted in San Diego Creek demonstrate that persistent aquatic toxicity is caused largely by diazinon and chlorpyrifos. Investigations conducted in Upper Newport Bay demonstrate that persistent aquatic toxicity is caused largely by chlorpyrifos.
5. In response to the findings of aquatic toxicity, the Regional Board listed San Diego Creek and Newport Bay as water quality limited in accordance with Section 303(d) of the Clean Water Act. Section 303(d) requires the establishment of a Total Maximum Daily Load (TMDL) for the pollutant(s) causing the toxicity (diazinon and chlorpyrifos). Section 303(d) also requires the allocation of the TMDL among sources of diazinon and chlorpyrifos. State law requires an implementation plan and schedule to ensure that the TMDL is met and compliance with water quality standards is achieved.
6. On June 14, 2002, the U.S. Environmental Protection Agency (U.S. EPA) established a TMDL for diazinon and chlorpyrifos in San Diego Creek, and for chlorpyrifos in Upper Newport Bay. The U.S. EPA TMDL did not include an implementation plan.

7. The Basin Plan amendment shown in the attachment to this Resolution was developed in accordance with Water Code Section 13240 *et seq.* The amendment is proposed for incorporation into Chapter 5 "Implementation", of the Basin Plan. The amendment specifies a TMDL that includes an implementation plan but is otherwise identical to the TMDL established by the U.S. EPA with respect to the numeric targets and load allocations. The proposed Basin Plan amendment also provides background information concerning the water quality impairment being addressed, and the sources of diazinon and chlorpyrifos in the Newport Bay watershed. The proposed TMDL is supported by a detailed report prepared by Regional Board staff and titled "Diazinon and Chlorpyrifos TMDL, Upper Newport Bay and San Diego Creek, April 4, 2003 (hereinafter, "TMDL Report").
8. The process of basin planning has been certified by the Secretary of Resources as functionally equivalent to the preparation of an Environmental Impact Report or Negative Declaration, as required by the California Environmental Quality Act (Public Resources Code Section §21000 *et seq.*). The Basin Plan amendment package includes an Environmental Checklist and staff reports that include an assessment of the potential environmental impacts of the Basin Plan amendment and a discussion of alternatives. The amended Basin Plan, Environmental Checklist, staff reports, and supporting documentation are functionally equivalent to an Environmental Impact Report or Negative Declaration.
9. The proposed amendment will result in no potential for adverse effect, either individually or cumulatively, on wildlife, or the habitat upon which the wildlife depends.
10. The Regional Board has considered federal and state anti-degradation policies and other relevant water quality control policies and finds the amendment consistent with those policies.
11. The TMDL Report was scientifically peer reviewed in January and February, 2003. In response to the comments received, additional data concerning degradation pathways for diazinon and chlorpyrifos were added to the TMDL Report. No changes to the proposed Basin Plan amendment shown in the Attachment to this Resolution were required.
12. In February, 2003, a Notice of Filing, the TMDL Report, environmental checklist, and the draft amendment were prepared and distributed to interested individuals and public agencies for review and comment, in accordance with state and federal regulations (23 CCR §3775, 40 CFR 25 and 40 CFR 131).
13. On February 21, 2003, the Regional Board held a Public Workshop to consider the Basin Plan amendment. This meeting served as Public Scoping meeting, as required by the California Environmental Quality Act. Notice of the workshop was given to all interested persons.

14. Notice of the public hearing to consider adoption of the proposed Basin Plan amendment was published in accordance with Water Code Section §13244.
15. This amendment will affect all dischargers in the Newport Bay Watershed by requiring them to institute monitoring programs for diazinon and chlorpyrifos, and imposing limits on discharges of these compounds.

The Regional Board has considered the costs of implementing the amendment and finds these costs to be reasonable. The costs associated with the reductions in diazinon and chlorpyrifos required by the TMDL will result largely from the re-registration agreements for these compounds, and not the TMDL.

16. The Basin Plan amendment must be submitted for review and approval by the SWRCB, OAL, and the U.S. Environmental Protection Agency (U.S. EPA). Once approved by the SWRCB, the amendment is submitted to OAL. A Notice of Decision will be filed after the SWRCB, OAL, and U.S. EPA have acted on this matter. The SWRCB will forward the approved amendment to U.S. EPA for review and approval.
17. For the purposes of specifying compliance schedules in NPDES permits for effluent limitations necessary to implement this TMDL, the schedule(s) specified in this TMDL shall govern, notwithstanding other compliance schedule authorization language in the Basin Plan.
18. The adoption of this TMDL is necessary to reduce loadings of diazinon and chlorpyrifos, and to address water quality impairments that arise therefrom.

NOW, THEREFORE BE IT RESOLVED THAT:

1. The Regional Board adopts the amendment to the Water Quality Control Plan for the Santa Ana River Basin (Region 8), as set forth in the attachment.
2. The Executive Officer is directed to forward copies of the Basin Plan amendment to the SWRCB in accordance with the requirements of Section §13245 of the California Water Code.
3. The Regional Board requests that the SWRCB approve the Basin Plan amendment, in accordance with Sections §13245 and §13246 of the California Water Code, and forward it to the OAL and U.S. EPA for approval.
4. If, during its approval process, the SWRCB or OAL determines that minor, non-substantive corrections to the language of the amendment are needed for clarity or consistency, the Executive Officer may make such changes, and shall inform the Board of any such changes.

5. The Executive Officer is authorized to sign a Certificate of Fee Exemption in lieu of payment of the California Department of Fish and Game filing fee.

I, Gerard J. Thibeault, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of a resolution adopted by the California Regional Water Quality Control Board, Santa Ana Region, on April 4, 2003.

Gerard J. Thibeault
Executive Officer

TENTATIVE

ATTACHMENT TO RESOLUTION NO. R8-2003-039

(added language is underlined, deleted language is struck out or otherwise identified)

Amendment to the Santa Ana Region Basin Plan

Chapter 5 - Implementation Plan, Discussion of Newport Bay Watershed (page 5-39 *et seq*)

Delete the existing discussion entitled: "Toxic Substance Contamination" on pages 5-41 and 5-42 of the Basin Plan:

~~Toxic Substance Contamination~~

~~As described in Chapter 6 (Monitoring and Assessment), a number of monitoring programs are conducted by the Regional Board and local agencies to determine the presence and sources of toxic substances in Newport Bay and its watershed. These studies have shown high levels of certain trace metals and organics in San Diego Creek and at certain locations in the Bay itself. As a result of these findings, the Board has designated San Diego Creek as a water quality limited segment. Further evaluation of toxic constituents in the Upper and Lower Newport Bay is being addressed by the Bay Protection and Toxic Cleanup Program, which is discussed later in this chapter.~~

~~Sources of these trace metals and organics include past and present agricultural activities, erosion and transport of soils to which toxicants are bound, boatyard operations, and stormwater runoff.~~

~~The efforts described earlier to reduce erosion and siltation and to control nutrient inputs in agricultural irrigation tailwaters should also result in reduced loadings of toxics to the Bay and its tributaries.~~

~~Boatyard operations in the Region are regulated by the Regional Board under NPDES permits. Each operator is required to develop and implement a Pollution Control Plan (PCP) to prevent discharges of pollutants to the Bay. In 1989-90, the Regional Board conducted a study to evaluate the effectiveness of the PCPs utilized by boatyards in Newport Bay (and Anaheim Bay-Huntington Harbour) [Ref. 15]. The study found that some boatyard waste collection and treatment practices are not effective in reducing the discharge of heavy metals to the Bay. Specific recommendations for necessary improvements were provided and are generally being implemented. Where necessary, enforcement actions will be taken by the Board to address continuing problems.~~

~~During 1992-93, the Regional Board contracted with local universities to further evaluate the occurrence and impacts of toxics in the Newport Bay watershed. The results are contained in final reports prepared by UC Irvine and UC Davis [Ref 16, 17]. The results of the study indicated that metal concentrations in Newport Bay and its watershed have generally improved, with the exception of locations near boatyard facilities. This confirms the data used to designate Lower Newport Bay as a Toxic Hot Spot (see following discussion). Endosulfan was found to be ubiquitous in the watershed. DDT also persists in the Bay and watershed. In most cases, endosulfan and DDT levels exceeded established water quality criteria.~~

~~The chronic toxicity bioassays on the freshwater samples indicated no toxicity due to metals. Some toxicity was observed, apparently caused by one or more nonpolar organic compounds. Additional efforts should focus on a more specific identification of the toxic compound(s). Additional discussion of the Newport Bay Coordinating Council and their activities in Newport Bay, is provided in Chapter 7.~~

Add the following:

4 Toxic Substances Contamination

San Diego Creek and Newport Bay are not attaining water quality standards with respect to certain classes of toxic pollutants. On June 14, 2002, USEPA established Total Maximum Daily Loads (TMDLs) for selenium, heavy metals (cadmium, copper, lead, and zinc), organochlorine pesticides (chlordane, dieldrin, DDT, and toxaphene), PCBs, and organophosphate pesticides (diazinon and chlorpyrifos). In addition, USEPA established a separate TMDL for the Rhine Channel in Lower Newport Bay. Table 5-9i shows these TMDLs, the constituents addressed, and the waterbodies affected.

USEPA's TMDLs do not specify implementation plans, which are the responsibility of the Regional Board. The Regional Board has adopted or will adopt Basin Plan amendments to incorporate the USEPA TMDLs, revised if and as appropriate, into the Basin Plan. These amendments will include implementation plans. The anticipated schedule for these Basin Plan amendments is also shown in Table 5-9i.

Table 5-9i. USEPA TMDLs Established June 14, 2002

TMDL	Basin Plan Schedule	Location	Constituents
Organophosphate Pesticides	2003	SDC	Diazinon, chlorpyrifos
		UNB	Chlorpyrifos
Selenium	2007	SDC, UNB LNB	Selenium
Metals	2007	SDC	Cd, Cu, Pb, Zn
		UNB	Cd, Cu, Pb, Zn
		LNB	Cu, Pb, Zn
Organochlorine Compounds	2007	SDC	Chlordane, dieldrin, DDT, PCBs, toxaphene
		UNB	Chlordane, DDT, PCBs
		LNB	Chlordane, dieldrin, DDT, PCBs
Rhine Channel	2007	Rhine Channel	Se, Cr, Hg, Cu, Pb, Zn Chlordane, dieldrin, DDT, PCBs

SDC= San Diego Creek; UNB=Upper Newport Bay; LNB=Lower Newport Bay

4.a Diazinon and Chlorpyrifos TMDL

Aquatic toxicity in San Diego Creek and Upper Newport Bay causes adverse impacts to the established beneficial uses of those waterbodies.

A report prepared by Regional Board staff describes the aquatic life toxicity problems in San Diego Creek and Upper Newport Bay in greater detail and discusses the technical basis for

the TMDL that follows¹. This TMDL is the same as that promulgated by the USEPA on June 14, 2002, but an implementation plan is also specified (see Section 4.a.i.). The USEPA TMDL was, in fact, based on a draft TMDL prepared by Regional Board staff. The TMDL addresses toxicity due to diazinon and chlorpyrifos in San Diego Creek and chlorpyrifos in Upper Newport Bay. Implementation of this TMDL is expected to address, to a significant extent, the occurrence of aquatic life toxicity in these waterbodies. Reduction in aquatic life toxicity will help assure attainment of water quality standards; that is, compliance with water quality objectives and protection of beneficial uses.

Table 5-9j shows the TMDL and the allocations for diazinon and chlorpyrifos in San Diego Creek.

Table 5-9j. Diazinon and Chlorpyrifos Allocations for San Diego Creek

Category	Diazinon (ng/L)		Chlorpyrifos (ng/L)	
	Acute	Chronic	Acute	Chronic
Wasteload Allocation	72	45	18	12.6
Load allocation	72	45	18	12.6
MOS	8	5	2	1.4
TMDL	80	50	20	14

MOS = Margin of Safety; Chronic means 4-consecutive day average

Table 5-9k shows the TMDL and the allocations for chlorpyrifos in Upper Newport Bay.

Table 5-9k. Chlorpyrifos Allocations for Upper Newport Bay

Category	Acute (ng/L)	Chronic (ng/L)
Wasteload allocation	18	8.1
Load allocation	18	8.1
MOS	2	0.9
TMDL	20	9

MOS = Margin of Safety; Chronic means 4-consecutive day average

The TMDL and its allocations contain an explicit 10% margin of safety. In addition, a substantial margin of safety is implicitly incorporated in the TMDL through use of conservative assumptions.

4.a.i TMDL Implementation

Table 5-9l outlines the tasks and schedules to implement the TMDL.

¹ Diazinon and Chlorpyrifos TMDL, Upper Newport Bay and San Diego Creek, April 4, 2003

Table 5-9I. TMDL Task Schedule

Task No.	Task	Schedule	Description
1	USEPA Re-Registration Agreements	12/2001 to 12/2006	Phase-out of uses specified in the re-registration agreements. Should end over 90% of usage. ²
2	Revise Discharge Permits	2005	WDR and NPDES permits will be revised to include the TMDL allocations, as appropriate.
3	Pesticide Runoff Management Plan	2004	A pesticide runoff management plan will be developed
4	Monitoring	2003	Modify existing regional monitoring program to include analysis for organophosphate pesticides and toxicity
	Special Studies		
5a	Atmospheric deposition	2003	Quantify atmospheric deposition of chlorpyrifos loading to Upper Newport Bay
5b	Mixing volumes in Upper Newport Bay	2003	Model mixing and stratification of chlorpyrifos in Upper Newport Bay during storm events

Task 1: USEPA Re-Registration Agreements

The re-registration agreements negotiated by USEPA with the manufacturers of diazinon and chlorpyrifos are the most significant factor affecting the implementation plan. Usage of both diazinon and chlorpyrifos in the Newport Bay Watershed is expected to be reduced by over 90 percent.

Task 2: Revise Discharge Permits

The TMDL allocates wasteloads to all dischargers in the watershed. Since the TMDL is concentration-based, these wasteloads are concentration limits. The concentration limits will be incorporated into existing and future discharge permits in the watershed. Compliance schedules would be included in permits only if they are demonstrated to be necessary. Compliance would be required as soon as possible, but no later than December 1, 2007.

Task 3: Pesticide Runoff Management Plan

A pesticide runoff management plan will be developed for the watershed as a cooperative project between the Regional Board and stakeholders.

Task 4: Monitoring

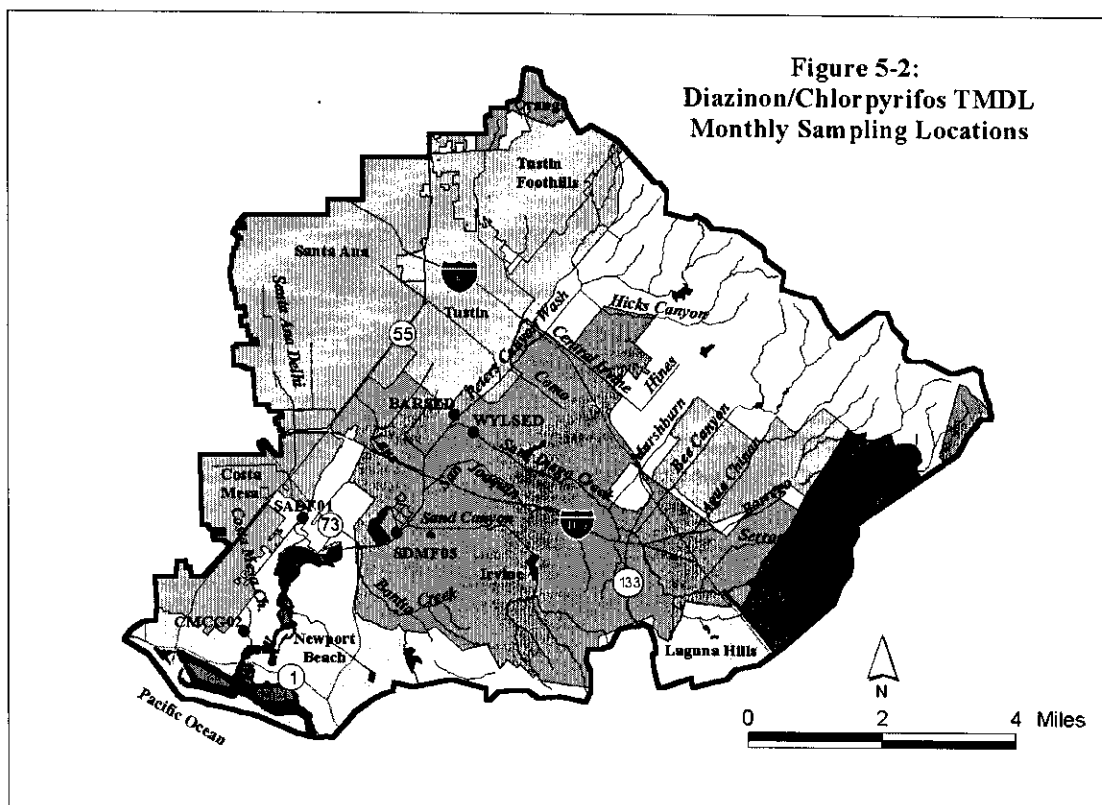
Routine monitoring is necessary to assess compliance with the allocations specified in the TMDL. The County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach, and the agricultural operators in the Newport Bay

² This task is not within the purview of the Regional Board, but is nevertheless of critical significance for implementation of the TMDL.

watershed will be required to propose a plan by January 30, 2004 for routine monitoring to determine compliance with the TMDL allocations for diazinon and chlorpyrifos. At a minimum, the proposed plan must include the collection of monthly samples at the stations specified in Table 5-9m and shown in Figure 5-2 and analysis of the samples for diazinon and chlorpyrifos. Monthly toxicity tests should also be conducted at several locations in the watershed. Data summaries will be required monthly. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL will be required to be submitted by November 30 of each year.

Table 5-9m. Minimum Required Monthly Sampling Stations

Station Code	Location
BARSED	Peters Canyon Wash
WYLSER	San Diego Creek at Harvard Dr.
SDMF05	San Diego Creek at Campus Dr.
SADF01, or CMCG02	Santa Ana Delhi Channel, or Costa Mesa Channel



In lieu of this coordinated, regional monitoring plan, one or more of the parties identified in the preceding paragraph may submit an individual or group plan to conduct routine monitoring in areas solely within their jurisdiction to determine compliance with the TMDL. Any such individual or group plans must also be submitted by January 30, 2004. Reports of the data collected pursuant to approved individual/group plan(s) will be required to be submitted monthly, and an annual report summarizing the data and evaluating compliance with the TMDL will be required to be submitted by November 30 of each year.

It is likely that implementation of these requirements will be through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and implemented upon the Regional Board's approval.

Task 5: Special Studies

With the anticipated assistance of stakeholders in the watershed, the Regional Board will conduct investigations to (1) quantify the significance of atmospheric deposition of chlorpyrifos to Upper Newport Bay, and (2) determine the adequacy of the freshwater allocations for chlorpyrifos in the tributaries to Upper Newport Bay in achieving the lower saltwater allocations. The existing hydrodynamic model for Newport Bay is being used to perform simulations that predict contaminant concentrations in the Bay based on various flow and management scenarios. The model results will be used to verify whether the TMDL allocations for chlorpyrifos in the watershed will be sufficient to achieve the TMDL allocations in Upper Newport Bay. One of the questions to be addressed is the magnitude of toxic exposure that could result from development of a freshwater lens associated with the discharge of stormwater to Upper Newport Bay.

4.a.ii Adjust TMDL

Based on the results of the special studies and recommendations made in the Pesticide Runoff Monitoring reports, changes to the TMDL may be warranted. Such changes would be considered through the Basin Plan Amendment process.

The Regional Board is committed to the review of this TMDL every three years, or more frequently if warranted by these or other studies.

APPENDIX A

REVISIONS TO FEBRUARY 21, 2003 DRAFT ATTACHMENT TO RESOLUTION NO. R8-2003-039

(added language is underlined, deleted language is struck out or otherwise identified)

Amendment to the Santa Ana Region Basin Plan

Chapter 5 - Implementation Plan, Discussion of Newport Bay Watershed (page 5-41³⁹ *et seq*)

Delete the existing discussion entitled: "Toxic Substance Contamination" on pages 5-41 and 5-42 of the Basin Plan:

Toxic Substance Contamination

As described in Chapter 6 (Monitoring and Assessment), a number of monitoring programs are conducted by the Regional Board and local agencies to determine the presence and sources of toxic substances in Newport Bay and its watershed. These studies have shown high levels of certain trace metals and organics in San Diego Creek and at certain locations in the Bay itself. As a result of these findings, the Board has designated San Diego Creek as a water quality limited segment. Further evaluation of toxic constituents in the Upper and Lower Newport Bay is being addressed by the Bay Protection and Toxic Cleanup Program, which is discussed later in this chapter.

Sources of these trace metals and organics include past and present agricultural activities, erosion and transport of soils to which toxicants are bound, boatyard operations, and stormwater runoff.

The efforts described earlier to reduce erosion and siltation and to control nutrient inputs in agricultural irrigation tailwaters should also result in reduced loadings of toxics to the Bay and its tributaries.

Boatyard operations in the Region are regulated by the Regional Board under NPDES permits. Each operator is required to develop and implement a Pollution Control Plan (PCP) to prevent discharges of pollutants to the Bay. In 1989-90, the Regional Board conducted a study to evaluate the effectiveness of the PCPs utilized by boatyards in Newport Bay (and Anaheim Bay-Huntington Harbour) [Ref. 15]. The study found that some boatyard waste collection and treatment practices are not effective in reducing the discharge of heavy metals to the Bay. Specific recommendations for necessary improvements were provided and are generally being implemented. Where necessary, enforcement actions will be taken by the Board to address continuing problems.

During 1992-93, the Regional Board contracted with local universities to further evaluate the occurrence and impacts of toxics in the Newport Bay watershed. The results are contained in final reports prepared by UC Irvine and UC Davis [Ref. 16, 17]. The results of the study

indicated that metal concentrations in Newport Bay and its watershed have generally improved, with the exception of locations near boatyard facilities. This confirms the data used to designate Lower Newport Bay as a Toxic Hot Spot (see following discussion). Endosulfan was found to be ubiquitous in the watershed. DDT also persists in the Bay and watershed. In most cases, endosulfan and DDT levels exceeded established water quality criteria.

The chronic toxicity bioassays on the freshwater samples indicated no toxicity due to metals. Some toxicity was observed, apparently caused by one or more nonpolar organic compounds. Additional efforts should focus on a more specific identification of the toxic compound(s). Additional discussion of the Newport Bay Coordinating Council and their activities in Newport Bay, is provided in Chapter 7.

Add the following:

5.4 Toxic Substances Contamination

San Diego Creek and Newport Bay are not attaining water quality standards with respect to certain classes of toxic pollutants. On June 14, 2002, USEPA established Total Maximum Daily Loads (TMDLs) for selenium, heavy metals (cadmium, copper, lead, and zinc), organochlorine pesticides (chlordane, dieldrin, DDT, and toxaphene), PCBs, and organophosphate pesticides (diazinon and chlorpyrifos). In addition, USEPA established a separate TMDL for the Rhine Channel in Lower Newport Bay. Table 5-9i shows these TMDLs, the constituents addressed, and the waterbodies affected.

USEPA's TMDLs do not specify implementation plans, which are the responsibility of the Regional Board. The Regional Board has adopted or will adopt Basin Plan amendments to incorporate the USEPA TMDLs, revised if and as appropriate, into the Basin Plan. These amendments will include implementation plans. The anticipated schedule for these Basin Plan amendments is also shown in Table 5-9i.

Table 5-9i. USEPA TMDLs Established June 14, 2002

<u>TMDL</u>	<u>Basin Plan Schedule</u>	<u>Location</u>	<u>Constituents</u>
<u>Organophosphate Pesticides</u>	<u>2003</u>	<u>SDC</u>	<u>Diazinon, chlorpyrifos</u>
		<u>UNB</u>	<u>Chlorpyrifos</u>
<u>Selenium</u>	<u>2007</u>	<u>SDC, UNB LNB</u>	<u>Selenium</u>
<u>Metals</u>	<u>2007</u>	<u>SDC</u>	<u>Cd, Cu, Pb, Zn</u>
		<u>UNB</u>	<u>Cd, Cu, Pb, Zn</u>
		<u>LNB</u>	<u>Cu, Pb, Zn</u>
<u>Organochlorine Compounds</u>	<u>2007</u>	<u>SDC</u>	<u>Chlordane, dieldrin, DDT, PCBs, toxaphene</u>
		<u>UNB</u>	<u>Chlordane, DDT, PCBs</u>
		<u>LNB</u>	<u>Chlordane, dieldrin, DDT, PCBs</u>
<u>Rhine Channel</u>	<u>2007</u>	<u>Rhine Channel</u>	<u>Se, Cr, Hg, Cu, Pb, Zn Chlordane, dieldrin, DDT, PCBs</u>

SDC= San Diego Creek; UNB=Upper Newport Bay; LNB=Lower Newport Bay

4.a Diazinon and Chlorpyrifos TMDL

Aquatic toxicity in San Diego Creek and Upper Newport Bay causes adverse impacts on the established beneficial uses of those waterbodies.

A report prepared by Regional Board staff describes the aquatic life toxicity problems in San Diego Creek and Upper Newport Bay in greater detail and discusses the technical basis for the TMDL that follows¹. This TMDL is the same as that promulgated by the USEPA on June 14, 2002, but an implementation plan is also specified (see Section 4.a.i.). The USEPA TMDL was in fact based on a draft TMDL prepared by Regional Board staff. The TMDL addresses toxicity due to diazinon and chlorpyrifos in San Diego Creek and chlorpyrifos in Upper Newport Bay. Implementation of this TMDL is expected to address, to a significant extent, the occurrence of aquatic life toxicity in these waterbodies. Reduction in aquatic life toxicity will help assure attainment of water quality standards, that is, compliance with water quality objectives and protection of beneficial uses.

~~5.4.a Diazinon and Chlorpyrifos TMDL~~

Table 5-9j~~i~~ shows the TMDL and the allocations for diazinon and chlorpyrifos in San Diego Creek.

Table 5-9j~~i~~. Diazinon and Chlorpyrifos Allocations for San Diego Creek

Category	Diazinon (ng/L)		Chlorpyrifos (ng/L)	
	Acute	Chronic	Acute	Chronic
Wasteload Allocation	72	45	18	12.6
Load allocation	72	45	18	12.6
MOS	8	5	2	1.4
TMDL	80	50	20	14

MOS = Margin of Safety; Chronic means 4-consecutive day average

Table 5-9k~~j~~ shows the TMDL and the allocations for chlorpyrifos in Upper Newport Bay.

Table 5-9k~~j~~. Chlorpyrifos Allocations for Upper Newport Bay

Category	Acute (ng/L)	Chronic (ng/L)
Wasteload allocation	18	8.1
Load allocation	18	8.1
MOS	2.0	0.9
TMDL	20	9

MOS = Margin of Safety; Chronic means 4-consecutive day average

The TMDL and its allocations contain an explicit 10% margin of safety. In addition, a substantial margin of safety is implicitly incorporated in the TMDL through use of conservative assumptions

¹ Diazinon and Chlorpyrifos TMDL, Upper Newport Bay and San Diego Creek, April 4, February 21, 2003

5.4.a.i TMDL Implementation

Table 5-9**l**k outlines the tasks and schedules to implement the TMDL.

Table 5-9l**k. TMDL Task Schedule**

Task No.	Task	Schedule	Description
<u>1</u>	<u>USEPA Re-Registration Agreements</u>	<u>12/2001 to 12/2006</u>	<u>Phase-out of uses specified in the re-registration agreements. Should end over 90% of usage.</u> ²
1 <u>2</u>	Revise Discharge Permits	2005	WDR and NPDES permits will be revised to include the TMDL allocations, as appropriate.
2 <u>3</u>	Pesticide Runoff Management Plan	2004	A pesticide runoff management plan will be developed
3 <u>4</u>	Monitoring	2003	Modify existing regional monitoring program to include analysis for organophosphate pesticides and toxicity
4 <u>5</u>	Special Studies		
4a <u>5a</u>	Atmospheric deposition	2003	Quantify atmospheric deposition of chlorpyrifos loading to Upper Newport Bay
4b <u>5b</u>	Mixing volumes in Upper Newport Bay	2003	Model mixing and stratification of chlorpyrifos in Upper Newport Bay during storm events

Task 1: USEPA Re-Registration Agreements

The re-registration agreements negotiated by USEPA with the manufacturers of diazinon and chlorpyrifos; are-is the most significant factor affecting the implementation plan. Usage of both diazinon and chlorpyrifos in the Newport Bay Watershed is expected to be reduced by over 90 percent.

Task-~~1~~2: Revise Discharge Permits

The TMDL allocates wasteloads to all dischargers in the watershed. Since the TMDL is concentration-based, these wasteloads are concentration limits. The concentration limits will be incorporated into existing and future discharge permits in the watershed. Compliance schedules would be included in permits only if they are demonstrated to be necessary. Compliance would be required as soon as possible but no later than December 1, 2007.

² This task is not within the purview of the Regional Board, but is nevertheless of critical significance for implementation of the TMDL.

Task 23: Pesticide Runoff Management Plan

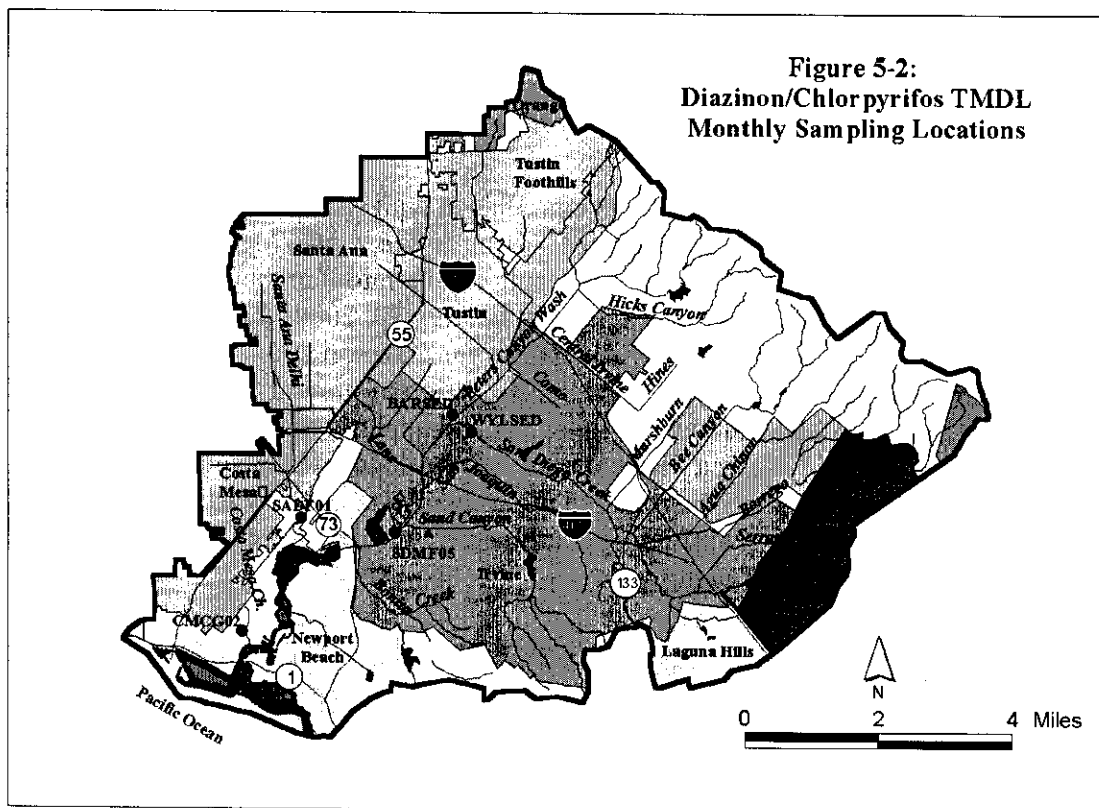
A pesticide runoff management plan will be developed for the watershed as a cooperative project between the Regional Board and stakeholders.

Task 34: Monitoring

Routine monitoring is necessary to assess compliance with the allocations specified in the TMDL. The County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach, and the agricultural operators in the Newport Bay watershed will be required to propose a plan by January 30, 2004, for routine monitoring to determine compliance with the TMDL allocations for diazinon and chlorpyrifos. At a minimum, the proposed plan must include the collection of monthly samples at the stations specified in Table 5-9m and shown in Figure 5-2 and analysis of the samples for diazinon and chlorpyrifos. Monthly toxicity tests should also be conducted at several locations in the watershed. Data summaries will be required monthly. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL will be required to be submitted by November 30 of each year.

Table 5-9m. Minimum Required Monthly Sampling Stations

Station Code	Location
BARSED	Peters Canyon Wash
WYLSER	San Diego Creek at Harvard Dr.
SDMF05	San Diego Creek at Campus Dr.
SADF01, or CMCG02	Santa Ana Delhi Channel, or Costa Mesa Channel



In lieu of this coordinated, regional monitoring plan, one or more of the parties identified in the preceding paragraph may submit an individual or group plan to conduct routine monitoring in areas solely within their jurisdiction to determine compliance with the TMDL. Any such individual or group plans must also be submitted by January 30, 2004. Reports of the data collected pursuant to approved individual/group plan(s) will be required to be submitted monthly and an annual report summarizing the data and evaluating compliance with the TMDL will be required to be submitted by ~~September 1~~ November 30 of each year.

It is likely that implementation of these requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and implemented upon the Regional Board's approval.

Task 54: Special Studies

~~Special investigations are needed~~ With the anticipated assistance of stakeholders in the watershed, the Regional Board will conduct investigations to (1) quantify the significance of atmospheric deposition of chlorpyrifos to Upper Newport Bay, and (2) determine the adequacy of the freshwater ~~numeric targets~~ allocations for chlorpyrifos in the tributaries to

Upper Newport Bay in achieving the lower saltwater ~~numeric target~~allocations. The existing hydrodynamic model for Newport Bay is being used to perform simulations that predict contaminant concentrations in the Bay based on various flow and management scenarios. The model results will ~~can~~ be used to verify whether the TMDL allocations ~~numeric targets~~ for chlorpyrifos in the watershed will be sufficient to achieve the TMDL allocations in Upper Newport Bay. One of the questions to be addressed is the magnitude of toxic exposure that could result from development of a freshwater lens associated with the discharge of stormwater to Upper Newport Bay.

5.4.a.2ii Adjust TMDL

Based on the results of the special studies and recommendations made in the Pesticide Runoff Monitoring reports, changes to the TMDL may be warranted. Such changes would be considered through the Basin Plan Amendment process.

The Regional Board is committed to the review of this TMDL every three years or more frequently if warranted by these or other studies.

APPENDIX B

PUBLIC COMMENTS AND RESPONSES

As of March 20, 2003, comments have been received on the draft Basin Plan amendment from the County of Orange Public Facilities and Resources Department (OCPFRD). The comments and responses are summarized below.

Comments on the TMDL Report

1. *Comment:* Cover Page: The date of the document should be changed from February 21, 2003 to April 4, 2003.

Response: The date has been changed to April 4, 2003

2. *Comment:* Section 1.0, first paragraph: Please add the underlined words for clarification: "On June 14, 2002, the United States Environmental Protection Agency (USEPA) established Total Maximum Daily Loads (TMDLs) for 14 toxic pollutants, including chlorpyrifos and diazinon in San Diego Creek and chlorpyrifos in Upper Newport Bay (USEPA 2002)."

Response: The text has been revised as suggested.

3. *Comment:* Section 4.3, Table 4-10b: This table lists baseflow concentrations. Change the table heading in the last column from "Stormflow Results" to "Baseflow Results."

Response: The table has been corrected as noted.

4. *Comment:* Section 4.3, Table 4-10b: This table lists baseflow concentrations. Change the table heading in the last column from "Stormflow Results" to "Baseflow Results."

Response: The table has been corrected as noted.

5. *Comment:* Section 4.4, second paragraph: Change "the Orange County" to "OCPFRD."

Response: The text has been revised as suggested.

6. *Comment:* Section 4.5, Figure 4-3: Is this figure referenced in the text? If not, it should be deleted. If so, it should be placed near the reference in the text, and, the name of the Figure should be clear as to what monitoring stations the map is showing (so as not to be confused with the Regional Monitoring Program monitoring stations).

Response: Figure 4-3 is referenced on page 26 and in the footnotes to Tables 4-10b and 4-13b. The figure is placed at the end of Section 4, which is the standard format used in the report. The sampling programs represented by the sampling stations in Figure 4-3 are described in Section 2 and referenced again on page 24. Some of these stations coincide with the (nutrient TMDL) Regional Monitoring Program stations.

7. *Comment:* Section 9.2, Table 9-1: Table 9-1 lists the task schedule for this TMDL. The task numbers should be listed chronologically. As they are currently listed, the first task (task No. 1 in Table 5-9k) is scheduled to occur in 2005 while the last task (task No. 5b), is scheduled to occur in 2003. The current order appears chronologically reversed.

Response: The tasks are arranged in order of significance. Although they could be rearranged chronologically, the tasks will not necessarily be implemented in sequential order.

8. *Comment:* Section 9.2.2, first paragraph: The four year compliance schedule is stated to begin in 2003. However, as this TMDL must proceed through the administrative process (approval by the Office of Administrative Law, the State Water Resources Control Board, and the US EPA), it is uncertain when such approval will occur. Any reference to the commencement of a monitoring program should reference a time period (such as 90 days) after the approval of the TMDL rather than an actual date.

Response: The Regional Board has authority under Section 13267 of the Water Code to require submission of technical information. The development of the monitoring plan is not contingent upon approval of the Basin Plan amendment. It should be noted that this TMDL has already been promulgated by USEPA; in this context, a Regional Board Section 13267 request for monitoring data is justified and reasonable.

9. *Comment:* Section 9.2.2, Table 9-2: This table states that the interim target deadline is June 2004. However, according to the Staff Report delivered to the Regional Board on February 21, 2003, the interim target deadline is June 2005. Please clarify this discrepancy. Also, due to the administrative process (please see comment above), it is uncertain when the TMDL will be approved. It is conceivable that such approval may not occur until June 2004, which would imply immediate compliance to meet the interim target. Instead of an actual date, perhaps the reference to an interim target should be stated in the form of a time period (such as a set number of months after TMDL approval).

Response: The interim target deadline has been corrected in Table 9-2 to June 2005. As discussed in Section 4.2 of the TMDL report, the re-registration agreements for diazinon and chlorpyrifos are expected to result in substantial reductions in the usage of these pesticides and their discharge to surface waters. These reductions are expected to be sufficient to achieve compliance with the interim numeric targets. The re-registration agreements are not within the Regional Board's purview, will take effect in the absence of TMDL approval, and thus will result in reductions in these pesticides irrespective of the development or approval of this TMDL. The compliance schedule in the TMDL properly acknowledges and reflects the effect of these agreements in achieving the requisite reductions to meet the numeric targets.

10. *Comment:* Section 9.2.2, Table 9-2: This table describes interim targets for the freshwater targets. The way in which interim targets and final targets were determined are not defined anywhere in the supporting technical documents. Please provide such supporting documentation.

Response: The interim targets are described in Section 9.22 (page 45) of the TMDL as based on $\frac{1}{2}$ the LC50 values for *Ceriodaphnia dubia*. The LC50s are listed in Table 3-1 (page 14). The final targets are equivalent to the TMDL allocations. For clarity, the word 'targets' has been replaced with 'allocations' in Section 9.2.2.

11. *Comment:* Section 9.2.4, second paragraph: The regional monitoring program includes four stations in Upper Newport Bay and one station in Lower Newport Bay.

Response: The text has been revised to reflect the correct number of existing Regional Monitoring Program sites in Upper and Lower Newport Bay.

12. *Comment:* Section 9.3, last paragraph: This paragraph discusses additional costs associated with this TMDL. The document should recognize the increased costs incurred by the County of Orange and numerous cities in order to provide additional monitoring for diazinon and chlorpyrifos and any other pesticide monitoring required by the Regional Board. These costs will include the purchase of new equipment, additional chemical analysis, and increased labor associated with the collection of samples.

Response: The following text has been added to Section 9.3: "Increased costs will be incurred by the County of Orange and the cities within the watershed in order to provide additional monitoring for diazinon and chlorpyrifos. These costs will include the purchase of new equipment, additional chemical analyses, and increased labor costs associated with the collection of samples."

Comments on the Draft Resolution No. R8-2003-039

Comment: Item No. 7: The date of the TMDL Report should be changed from February 21, 2002 to April 4, 2003.

Response: The reference to the TMDL report has been updated.

Comments on the Draft Attachment to Resolution No. R8-2003-039

1. *Comment:* Footnote No. 1: The date of the TMDL is listed as February 21, 2003. This date should be changed to April 4, 2003 (the date of the proposed Basin Plan Amendment).

Response: The date has been changed to April 4, 2003

2. *Comment:* Section 5.4.a.i, Table 5-9j: Use decimal points consistently throughout the table (i.e. delete the decimal point in 2.0).

Response: The number has been formatted as suggested without the decimal point.

3. *Comment:* Section 5.4.a.i, Table 5-9k: Table 5-9k lists the task schedule for this TMDL. The task numbers should be listed chronologically. As they are currently listed, the first task (task No. 1 in Table 5-9k) is scheduled to occur in 2005 while the last task (task No. 4b), is scheduled to occur in 2003. The current order appears chronologically reversed.

Response: The tasks are arranged in order of significance. Although they could be rearranged chronologically this is not necessary as the tasks do not need to be implemented in sequential order.

4. *Comment:* Section 5.4.a.i, Table 5-9k: Table 9-1 of Appendix A (TMDL Task Schedule) and Table 5-9k of the Basin Plan Amendment (TMDL Task Schedule) should be exactly the same. The table in

Appendix A contains an additional task (USEPA Re-registration Agreements) that is not listed in the Basin Plan Amendment.

Response: The table has been changed to include the USEPA Re-registration Agreements along with a footnote that indicates this task is not within the purview of the Regional Board, but is of critical significance to the implementation plan nonetheless.

5. *Comment:* Section 5.4.a.i, Task 3, first paragraph: In this section, it is stated that a routine monitoring plan is required to be proposed by January 30, 2004. However, as this TMDL must proceed through the administrative process (approval by the Office of Administrative Law, the State Water Resources Control Board, and the US EPA), it is uncertain when such approval will occur. Any reference to the commencement of a monitoring program should reference a time period (such as 90 days) after the approval of the TMDL rather than an actual date.

Response: The Regional Board has authority under Section 13267 of the Water Code to require submission of technical information. The development of the monitoring plan is not contingent upon approval of the Basin Plan amendment. It should be noted that this TMDL has already been promulgated by USEPA; in this context, a Regional Board Section 13267 request for monitoring data is justified and reasonable.

6. *Comment:* Section 5.4.a.i, Task 3, first paragraph: Task 3 references Table 5-91 and Figure 5-2 (monthly sampling stations). This table and figure are not provided in the Basin Plan Amendment. Please revise to include the proper table and figure.

Response: The table and figure, which were inadvertently omitted from the February 21, 2003 draft, are now included in the attachment.

7. *Comment:* Section 5.4.a.i, Task 3, first paragraph: The monthly reports of data collection will require a month lag time from collection to reporting. The turnaround time for analysis and results from contract laboratories is about a month. For example, data collected from February 1, 2003 to February 28, 2003 would be contained in a report dated March 31, 2003.

Response: Comment noted. The details of the monitoring and reporting plan will be determined as the plan is developed.

8. *Comment:* Section 5.4.a.i, Task 3, first paragraph: The County recommends that in lieu of monthly data summaries, the County will make data available upon request.

Response: Monthly data summaries are required in order for the Regional Board to take appropriate, timely action when toxic events occur. These actions could include analysis of monitoring data to determine which analytes may have caused the toxic event, coordination with other agencies to investigate the source of the toxic runoff, and coordination with the Department of Pesticide Regulation to evaluate permitted pesticide uses which may be continuing threats to water quality.

9. *Comment:* Section 5.4.a.i, Task 3, second paragraph: The annual report submittal date of September 1 of each year should be changed to November 30 of each year.

Response: The annual report submittal date has been changed as suggested to November 30.

10. *Comment:* Section 5.4.a.i, Task 4: It should be clarified that the Regional Board will conduct the stated special studies.

Response: The phrase in the first sentence “Special investigations are needed...” has been changed to “With the anticipated assistance of stakeholders in the watershed, the Regional Board will conduct investigations...”

11. *Comment:* Section 5.4.a.i, Task 4: Before any modifications to this TMDL are made based upon the results of the model described, the results should be validated with a short-term monitoring study.

Response: Comment noted.

12. *Comment:* Section 5.4.a.2: The numbering system is incorrect. The previous section uses a roman numeral (5.4.a.i). Change either 5.4.a.i or 5.4.a.2 to be consistent.

Response: The subsection heading has been changed to 4.a.ii

APPENDIX C

Revisions to the February 21, 2003 Draft TMDL Report

(added language is underlined, deleted language is struck out or otherwise identified)

Changes were made on the following pages to the February 21, 2003 draft TMDL Report:

1. Cover Page
2. List of Tables
3. Section 1.0, Page 1
4. Section 4.3, Page 27
5. Section 4.3, Page 31
6. Section 4.4, Page 34
7. Section 9.2.2, Page 45
8. Section 9.2.2, Page 46
9. Section 9.2.4, Page 53
10. Section 9.3, Page 54

Diazinon and Chlorpyrifos TMDL
Upper Newport Bay and San Diego Creek

California Regional Water Quality Control Board
Santa Ana Region

~~February 21, 2003~~

April 4, 2003

Diazinon and Chlorpyrifos TMDL: Upper Newport Bay and San Diego Creek
List of Tables

<u>Table</u>	<u>Title</u>	<u>Page</u>
Table 1-1	Land Use in the Newport Bay Watershed	1
Table 2-1	Results of <i>Ceriodaphnia</i> Acute Toxicity Tests	12
Table 3-1	Potential Numeric Targets and Reference Values	14
Table 3-2	Selected Numeric Target	16
Table 4-1	Pesticide Properties	17
Table 4-2	Diazinon Formulations Used in Orange County, 1999	18
Table 4-3	Chlorpyrifos Formulations Used in Orange County, 1999	19
Table 4-4	Reported and Estimated Diazinon Use, Orange County: 1995-1999 (lbs ai)	21
Table 4-5	Reported and Estimated Diazinon Use, Orange County: 1995-1999 (%)	21
Table 4-6	Reported and Estimated Chlorpyrifos Use, Orange County: 1995-1999(lbs ai)	22
Table 4-7	Reported and Estimated Chlorpyrifos Use, Orange County: 1995-1999(%)	23
Table 4-8	Summary of Diazinon Sampling Results	24
Table 4-9	Diazinon Results by Waterbody Group	25
Table 4-10a	Land Use and Diazinon Stormflow Concentrations: 1996-2000	26
Table 4-10b	Land Use and Diazinon Baseflow Concentrations: 1996-2000	27
Table 4-11	Summary of Chlorpyrifos Sampling Results	28
Table 4-12	Chlorpyrifos Results by Waterbody Group	28
Table 4-13a	Land Use and Chlorpyrifos Stormflow Concentrations: 1996-2000	30
Table 4-13b	Land Use and Chlorpyrifos Baseflow Concentrations: 1996-2000	31
Table 4-14	Estimated Mean Annual Diazinon Load: San Diego Creek, Campus Station	35
Table 4-15	Estimated Mean Annual Chlorpyrifos Load: San Diego Creek, Campus Station	35
Table 6-1	Diazinon and Chlorpyrifos Allocations for San Diego Creek	39
Table 6-2	Chlorpyrifos Allocations for Upper Newport Bay	40
Table 6-3	Needed Load (concentration-based) Reductions for San Diego Creek	40
Table 9-1	TMDL Task Schedule	44
Table 9-2	Numeric Target <u>Wasteload Allocation</u> Compliance Schedule	46
Table 9-3	Selected CDPR-Reported Pesticides Used in Orange County, 1999	47

1.0 INTRODUCTION

On June 14, 2002, the United States Environmental Protection Agency (USEPA) established Total Maximum Daily Loads (TMDLs) for 14 toxic pollutants, including chlorpyrifos and diazinon in San Diego Creek and chlorpyrifos in Upper Newport Bay (USEPA 2002). The USEPA TMDL for chlorpyrifos and diazinon was based on a draft TMDL prepared by staff of the Santa Ana Regional Water Quality Control Board (SARWQCB). To address impairment specified in the 1998 Section 303(d) list, the TMDL addressed diazinon and chlorpyrifos in both reaches of San Diego Creek and chlorpyrifos in Upper Newport Bay. TMDLs are required despite recent re-registration agreements to phase out certain uses of these two organophosphate pesticides by 2006 (USEPA 2001, 2000a).

This document summarizes the information presented in the USEPA TMDL document (USEPA 2002) and presents additional information related to the problem statement (Section 2) and development of the numeric targets (Section 3). The source analysis is discussed in Section 4. Loading capacity, allocations, seasonal variation, and the margin of safety are discussed in Sections 5,6,7, and 8, respectively. Finally, Section 9 of this document presents the implementation plan for the TMDL. The remainder of this introduction provides background information on the Newport Bay Watershed.

1.1 Watershed Background

The Newport Bay watershed is located in Orange County, Southern California. The watershed covers an area of 154 square miles (98,500 acres). Cities located partly or fully within the watershed include Orange, Tustin, Santa Ana, Irvine, Lake Forest, Laguna Hills, Costa Mesa, and Newport Beach (Figure 1-1). The watershed consists largely of the Tustin Plain, bounded to the east by the Santiago hills and by the San Joaquin hills to the west (Figure 1-2).

Land Use

Table 1-1 provides the latest available land use data for the San Diego Creek drainage and the Newport Bay watershed as a whole.

Table 1-1. Land Use in the Newport Bay Watershed

Land Use	San Diego Creek		Newport Bay Watershed	
	Acres	Percent	Acres	Percent
Vacant	21,910	28.5 %	23,462	23.9 %
Residential	11,668	15.2 %	19,420	19.7 %
Education/Religion/Recreation	15,811	20.6 %	17,393	17.7 %
Roads	10,295	13.4 %	15,774	16.0 %
Commercial	6,381	8.3 %	9,641	9.8 %
Industrial	3,965	5.2 %	5,263	5.4 %
Agriculture	5,092	6.6 %	5,147	5.2 %
Transportation	1,177	1.5 %	1,326	1.3 %
No code	440	0.6 %	936	0.9 %
Total	76,739	100%	98,362	99.9 %

Source: Orange County Public Facilities and Resources Department, provided March 2002

water discharged to Newport Bay on an annual basis, this would indicate that the overwhelming majority of the pesticide load would derive from stormflow rather than baseflow. The average concentration is actually higher for baseflow, but this is biased by a few very high detections from 1998 near nurseries. These results have not been observed in later sampling and the nurseries have subsequently instituted measures targeted at reducing pesticide runoff.

**Table 4-10b Land Use and Diazinon Baseflow Concentrations
Newport Bay Watershed: 1996-2000**

ID	Station	Land Use	Count	Stormflow-Baseflow Results (ng/L)			
				Min	Max	Avg.	Median
S1	El Modeno Nursery	Nursery	13	<40	2,320	580	131
S2	Hines Nursery	Nursery	15	<40	10,000	1,433	136
S3	Marshburn Ch	Nursery/Ag	1	<40	<40	<40	<40
S4	Central Irvine Ch	Ag/Residential	8	90	1,940	645	595
S5	El Modeno-Irvine Ch	Urban	1	180	180	180	180
S6	Peters Canyon Ch	Mixed	4	170	820	533	570
S7	SDC-Harvard	Mixed	2	<50	<50	<50	<50
S9	SDC-Campus	Mixed	30	<50	570	202	152
S10	Bonita Creek	Urban	12	49	332	139	114
S11	Santa Ana Delhi Ch	Urban	6	<50	340	149	125
S12	E. Costa Mesa Ch	Urban	10	<40	2,250	410	213

See Figure 4-3 for station locations, Ch = Channel, SDC=San Diego Creek

Although the sampling network is not detailed enough to identify individual sources (aside from nurseries), two conclusions are apparent:

- (1) Stormflow concentrations are virtually always higher than baseflow concentrations. This is particularly the case in the non-agricultural areas.
- (2) Urban areas tend to yield the highest stormwater runoff concentrations while the nursery areas tend to yield the higher baseflow concentrations.

Studies reported in the literature indicate that residential hotspots (individual homes) can account for most of the diazinon runoff from a neighborhood. Samples collected from the near vicinity of these residential hotspots (prior to dilution in the storm drain), showed concentrations above 10,000 ng/L (Scanlin and Feng 1997). Such detailed sampling and analysis for pesticides has not been completed in residential areas of the Newport Bay watershed. The residential run-off reduction study is currently in progress but results were not available for these TMDLs.

Chlorpyrifos Data Summary

Table 4-11 summarizes the chlorpyrifos results. The detection frequency is lower than for diazinon. This is due, in part, to the lower solubility of chlorpyrifos, and its greater affinity for sediment (Table 4-1). The lower mobility of chlorpyrifos results in lower concentrations in the

**Table 4-13b: Land Use and Chlorpyrifos Baseflow Concentrations
Newport Bay Watershed: 1996-2000**

ID	Station	Land Use	Count	Stormflow Baseflow Results (ng/L)		
				Detections	Median	Max
S1	El Modeno Nursery	Nursery	13	15 %	<40	57
S2	Hines Nursery	Nursery	15	53 %	<50	670
S3	Marshburn Ch	Nursery/Ag	1	0 %	<40	<40
S4	Central Irvine Ch	Ag/Urban	8	75 %	63	315
S5	El Modeno-Irvine Ch	Urban	1	0 %	<50	<50
S6	Peters Canyon Ch	Mixed	4	50 %	53.5	420
S7	SDC-Harvard	Mixed	2	50 %	225	400
S8	San Joaquin Ch	Ag/Open	0	---	---	---
S9	SDC-Campus	Mixed	30	47 %	<50	580
S10	Bonita Creek	Urban	12	0 %	<40	<40
S11	Santa Ana Delhi Ch	Urban	6	33 %	<50	18
S12	E. Costa Mesa Ch	Urban	10	20 %	<40	129

See Figure 4-3 for station locations, Ch = Channel, SDC=San Diego Creek

Note: S11 max less than median due to lower reporting limit for some samples

Point Sources

The Regional Board issues Waste Discharge Requirements (WDRs) and NPDES permits for discharges of waste to land and surface waters, respectively. There are thirteen individual waste discharge requirement (WDR) or NPDES permit holders in the Upper Newport Bay watershed. In addition, three general NPDES permits and an areawide municipal stormwater permit apply within the San Diego Creek/Newport Bay watershed.

NPDES

NPDES - Stormwater Runoff:

Stormwater and urban nuisance flows in that portion of Orange County within the Santa Ana Regional Board's jurisdiction (including the San Diego Creek/Newport Bay watershed) are regulated under an areawide municipal stormwater permit issued to Orange County and its co-permittees. As presented above, these flows are significant sources of diazinon and chlorpyrifos inputs to surface waters within the San Diego Creek/Newport Bay watershed. As discussed in Section 2, the OCPFRD monitoring program does not include analysis for organophosphate pesticides. However, considerable data have been collected from stormwater runoff channels as part of the 205j, 319h, and CDPR investigations.

NPDES – Extracted Groundwater:

Many NPDES regulated discharges within the San Diego Creek/Newport Bay Watershed consist of extracted groundwater resulting from dewatering activities or groundwater cleanup projects. The Regional Board has issued some individual permits for these discharges, but most are regulated under general NPDES permits. These discharges are not expected to be sources of diazinon and chlorpyrifos loads to the watershed (groundwater is discussed further below), and the dischargers are not required to monitor for organophosphate pesticides.

negligible in the Newport Bay Watershed. Rainfall collected in the winter of 1992-93 in the San Joaquin basin contained up to 1,900 ng/L diazinon, and is “presumed to be droplets from dormant spray applications (not volatilization from treated crops)” (Novartis 1997).

Assuming the measured rainfall concentration is representative for all storm events, and assuming no degradation during runoff, the annual diazinon load derived from rainfall would be approximately 0.7 lbs. This would be about 2% of the mean annual load at the SDC-Campus station. For chlorpyrifos, the load would be 1.3 lbs., or about 15% of the mean annual load.

It is uncertain whether this contribution is from volatilization from use within the watershed, or from aerial transport from sources outside the watershed. For estimating loads, the contribution from rainfall is already taken into account by the runoff sampling in the watershed. Direct deposition (rainfall falling directly into Upper Newport Bay) would be negligible since the area of the bay relative to the watershed is less than one percent. The diazinon load would be less than 0.0072 lbs., or less than 0.02% of the annual load to the Bay. For chlorpyrifos the load would be 0.0127 lbs. or about 0.15% of the total annual load.

4.4 Approach to Calculating Current Loads

This section presents calculations of estimated diazinon and chlorpyrifos loads to San Diego Creek and Upper Newport Bay. Because the TMDL is concentration based, the load information is presented for information purposes only and is not used as a basis for assigning allocations.

Mean annual loads were calculated using mean water column concentrations from the SDC-Campus station. Mean annual baseflow and stormflow volumes were calculated using the flow data for the SDC-Campus station. Baseflows are defined as flow rates less than or equal to 20 cfs at the SDC-Campus station. For the purposes of the diazinon and chlorpyrifos TMDL, stormflows are defined as flows greater than 20 cfs at the SDC-Campus station. Using these definitions, mean annual baseflow and stormflow volumes were calculated using 19 years of available flow data provided by the Orange County Public Facilities and Resources Department (OCPFRD). Loads were then determined by multiplying the mean concentrations with the mean flows. As the SDC-Campus station represents over 95% of the flow in the watershed, loads were not calculated for the other tributaries.

Diazinon

The estimated mean annual diazinon load at the SDC-Campus station is about 32 lbs (Table 4-14). This amounts to about 0.3% of the estimated 10,800 lbs of diazinon (ai) used within the watershed in 1999. This finding is similar to the results of a recent study in the Castro Valley (urban) watershed. That study found that 0.3% of the applied diazinon (ai) was discharged into Castro Valley Creek, with 90% of the load delivered by storm runoff (Scanlin and Feng 1997).

9.2.1 USEPA RE-REGISTRATION AGREEMENTS

Re-registration of diazinon and chlorpyrifos by the EPA is the most significant factor affecting the implementation plan. The phase-out is a consequence of the Food Quality Protection Act (FQPA) of 1996. The FQPA was passed unanimously by Congress in July 1997, and signed into law in August 1997. The FQPA:

- Establishes a single health-based standard for all pesticide residues in food
- Provides for a more complete assessment of potential risks with special protections for potentially sensitive groups, such as infants and children
- Requires reassessment of all existing pesticide residue limits
- Expedites approval of safer, reduced risk pesticides
- Encourages development of safer, effective crop protection tools
- Ensures that all pesticides are periodically re-evaluated for adherence to current safety standards
- Expands consumers' "right to know" about pesticide risks and benefits

The provisions of the FQPA have an important bearing on implementation of the diazinon and chlorpyrifos TMDL. Reassessment of pesticide residues began with the organophosphates, a group of 48 pesticides. New risk assessments were developed for the two most widely used organophosphates, diazinon and chlorpyrifos. During this process, USEPA negotiated re-registration agreements with the manufacturers of diazinon and chlorpyrifos (USEPA 2000a, 2001). As discussed in Section 4.2, these re-registration agreements are likely to end over 90 percent of the usage (as of 1999) in the Newport Bay watershed.

While acting to restrict most uses of diazinon and chlorpyrifos, the USEPA has also taken action, in accordance with the FQPA, to expedite review of reduced risk pesticides, including biopesticides. Biopesticides are distinguished from conventional chemical pesticides by their unique modes of action, low use volume, lower toxicity, and target species selectivity or natural occurrence. USEPA's actions are intended to ensure that safer alternatives to diazinon and chlorpyrifos are available (USEPA 1999c).

9.2.2 DISCHARGE PERMITS AND COMPLIANCE SCHEDULE

The TMDL allocates wasteload allocations to all dischargers in the watershed. Since the TMDL is concentration-based, the wasteload allocations are concentration limits. These concentration limits will be incorporated into existing and future discharge permits in the watershed. A four-year compliance schedule (beginning in 2003) is outlined in Table 9-2, with interim targets wasteload allocations (concentration limits) that are based on $\frac{1}{2}$ the LC50 values for *Ceriodaphnia dubia*. Compliance would be required as soon as possible but no later than the dates shown. Compliance schedules would be included in permits only if they are demonstrated to be necessary.

Table 9-2. Numeric Target Wasteload Allocation Compliance Schedule

Category	Freshwater Wasteload Allocation Target (ng/L)		
	Interim (By June 2005)	Final (By Dec 2007)	
	Maximum	Acute	Chronic
DIAZINON	220	72	45
CHLORPYRIFOS	30	18	12.6

The revised permits will include additional monitoring for organophosphate pesticides. The monitoring interval will depend on the type of discharge. For example, permits for groundwater dischargers may only need annual monitoring, while dischargers that use diazinon and chlorpyrifos products will require more frequent monitoring.

9.2.3 PESTICIDE RUNOFF MANAGEMENT PLAN

A pesticide runoff management plan (PRMP) will be developed for the watershed as a cooperative project between the Regional Board and stakeholders. The goals of the pesticide management plan will be to:

- Monitor pesticide usage
- Identify pathways leading to pesticide contamination of surface water
- Reduce pesticide runoff to the maximum extent practicable
- Summarize pesticide-related water quality activities on an annual basis

MONITORING USAGE

Table 9-3 shows selected pesticide use reported in Orange County. The pesticides are ranked by usage volume. Only those pesticides ranked in the top 50 that are potential water quality threats are listed. For example, the top three pesticides, soil fumigants that are gases at room temperature, are not listed below, as they are not expected to pose a threat to water quality.

Monitoring pesticide usage will allow management efforts to focus on those pesticides that are potential water quality threats. The available usage data indicate pesticides that should be targeted for water quality monitoring, and along with site-of-use data from the CDPR, may help to identify causes of toxic events in the watershed.

9.2.4 MONITORING

A Regional Monitoring Program (RMP) has been developed for the watershed as part of the nutrient TMDL. The RMP is intended to provide for efficient monitoring of the watershed through a cooperative, comprehensive monitoring program. The OCPFRD is the lead agency for the RMP. All dischargers are allowed to participate in the RMP in lieu of implementing separate, individual monitoring and reporting programs.

The RMP currently includes nine stations in the watershed ~~and five~~ four stations in Upper Newport Bay, ~~and one station in Lower Newport Bay~~. The number and location of the stations appears sufficient for implementation of the diazinon and chlorpyrifos TMDL. The existing monthly sampling frequency plus additional monitoring of storm events will provide the necessary data to ensure that the TMDL objectives are being achieved.

Aside from diazinon and chlorpyrifos, additional analytes for monitoring may include: bifenthrin (sediment and water column), carbaryl, dimethoate, malathion, and methomyl.

9.2.5 SPECIAL STUDIES

Two issues were identified during development of the TMDL that require further analysis:

- (1) The significance of atmospheric deposition to Upper Newport bay as a separate chlorpyrifos source; and,
- (2) The adequacy of the freshwater numeric targets for chlorpyrifos in the tributaries to Upper Newport Bay in achieving the lower saltwater numeric target.

The significance of atmospheric deposition for chlorpyrifos loading to Upper Newport bay will be quantified through analysis of rainwater samples in the vicinity of the Bay.

The existing hydrodynamic model for Newport Bay is being used to perform simulations that predict contaminant concentrations in the Bay based on various flow and management scenarios. The model results can be used to verify whether the numeric targets for chlorpyrifos in the watershed will be sufficient to achieve the TMDL in Upper Newport Bay.

Data from these studies may be used to refine the TMDL. Chlorpyrifos allocations for San Diego Creek may be changed, and additional targeted source control efforts may be incorporated into the implementation.

9.3 ECONOMIC CONSIDERATIONS

As previously stated, the Regional Board is required to include TMDLs in the Basin Plan. There are three statutory triggers for consideration of economics in basin planning. These triggers are:

- Adoption of an agricultural water quality control program (Water Code Section 13141). The Regional Board must estimate costs and identify potential financing sources in the Basin Plan before implementing any agricultural water quality control plan.
- Adoption of a treatment requirement or performance standard. The Regional Board must comply with the California Environmental Quality Act (CEQA) when amending the Basin Plan. CEQA requires that the Board consider the environmental effects of reasonably foreseeable methods of compliance with Basin Plan amendments that establish performance standards or treatment requirements, such as TMDLs. The costs of the methods of compliance must be considered in this analysis.
- Adoption of water quality objectives (Water Code Section 13241). The Regional Board is required to consider a number of factors, including economics, when establishing or revising water quality objectives in the Basin Plan.

It should be noted that in each of these cases, there is no statutory requirement for a formal cost-benefit analysis.

As discussed above, adoption of a TMDL does not constitute the adoption of new or revised water quality objectives, so the third statutory trigger does not apply here. However, implementation of this TMDL is likely to result in changes in agricultural (nursery) operations to control pesticide runoff. Similarly, implementation of this TMDL will likely necessitate changes in programs (including educational programs and BMPs) designed to reduce pesticide inputs from urban stormwater or other sources. It is necessary, therefore, to consider the costs and potential funding mechanisms for the implementation of new/modified agricultural water quality control programs, and the costs of other measures that may be necessary to achieve (and monitor) compliance with the TMDL.

The U.S. EPA re-registration agreements for diazinon and chlorpyrifos will result in dramatic reductions in the use of these chemicals and switches to alternative pesticides. While these new agreements are identified as a key part of this implementation plan, they are not within the Regional Board's jurisdiction and the costs of their implementation cannot be considered TMDL-related costs.

Information concerning the costs of implementation of this TMDL will be solicited during the public participation phase of consideration of this TMDL. Specifically, potentially affected parties will be asked to evaluate the TMDL-related costs, as distinct from those associated with implementation of the re-registration agreements. Given that the re-registration agreements will eliminate household uses of these pesticides, the impacts of the TMDL on urban stormwater permittees are expected to be minimal. Expenditures beyond those now necessary to comply with the established areawide urban stormwater permit would likely be focused on increased/enhanced public education efforts to assure proper pesticide use and disposal. Increased costs will be incurred by the County of Orange and the cities within the watershed in order to provide additional monitoring for diazinon and chlorpyrifos. These costs will include the purchase of new equipment, additional chemical analyses, and increased labor costs associated with the collection of samples. Higher costs are likely to be incurred by agricultural operations (nurseries)